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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/786,699

05/14/2001

Bruno Acklin

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4195

7590

01/30/2003

Fish & Richardson
225 Franklin Street
Boston, MA 02110-2804

EXAMINER

WANG, GEORGE Y

ART UNIT

PAPER NUMBER

2882

DATE MAILED: 01/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/786,699

Applicant(s)

ACKLIN ET AL.

Examiner

George Y. Wang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on _____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☒ Claim(s) 2,5,6,9,15 and 17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 January 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 119(a)-(d) and 120 as follows:

An application in which the benefits of an earlier application are desired must contain a specific reference to the prior application(s) in the first sentence of the specification or in an application data sheet (37 CFR 1.78(a)(2) and (a)(5)).

Specification

2. The abstract of the disclosure is objected to because it is not one paragraph, recites the title, and is improperly formatted.

Correction is required. See MPEP § 608.01(b).

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

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3. The disclosure is objected to because of the following informalities: Lack of properly named section titles, lack of proper section divisions, and other minor informalities.

Appropriate correction is required.

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or
REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)
- (e) BACKGROUND OF THE INVENTION.
 - (1) Field of the Invention.
 - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (f) BRIEF SUMMARY OF THE INVENTION.
- (g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (h) DETAILED DESCRIPTION OF THE INVENTION.
- (i) CLAIM OR CLAIMS (commencing on a separate sheet).
- (j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (k) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a

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nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

Claim Objections

4. Claims 2, 5, 6, 9, and 15 are objected to because the phrase "especially" and "particularly" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Appropriate correction is required.

5. Claim 2 is objected to because it has been held that the recitation "adapted to" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchinson*, 69 USPQ 138. Appropriate correction is required.

6. Claim 17 objected to because it is improper to use parenthetical citation for anything other than reference numerals. See MPEP § 608.01(m). Appropriate correction is required.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

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the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1, 9-11, and 14-19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Broom (U.S. Patent No. 5,516,727) in view of Tanaka et al. (U.S. Patent No. 5,218,611, from hereinafter "Tanaka '611").

Regarding claims 1 and 14, Broom discloses an arrangement comprising a light-emitting power semiconductor device (fig. 4, ref. 40) disposed on a substrate structure (fig. 4, ref. 43) and having a plastic protective body (fig. 4b, ref. 45) formed onto the substrate structure, leaving the light exit region of the semiconductor exposed to be coupled to an optical waveguide (fig. 4b, ref. 42) and out of the plastic protective body.

However, Broom fails to specifically disclose a transparent plastic material filling the space between light-emitting power semiconductor device and the optical waveguide.

Tanaka '611 discloses a laser diode system with a transparent plastic filling material (fig. 2, ref. 17), which also includes silicone (col. 4, lines 31-36).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a transparent plastic material filling the space between light-emitting power semiconductor device and the optical waveguide since one would be motivated to reduce loss between optical transmission of the semiconductor device and the waveguide (col. 2, lines 44-56). Furthermore, such a material filling minimizes dew and dust formation, ultimately enhancing laser light guiding performance (col. 2, lines 44-56).

As per claim 15, Broom discloses an arrangement as recited above where the light-emitting power semiconductor device is a semiconductor laser (abstract).

Regarding claims 16-18, Broom discloses a method of fabricating an arrangement as recited above where the light-emitting power semiconductor is placed against and electrically contacted by a substrate structure (fig. 4a), an optical waveguide is affixed to the substrate (fig. 4a), the protective plastic body is injection-coated (fig. 4c).

However, the reference fails to specifically disclose a light exit surface being exposed in the region of the outer periphery of the plastic protective body by breaking off a piece of the hardened protective body.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to expose the light exiting surface of the waveguide by breaking off the harden plastic body since one would be motivated to provide optical data transmission and to ensure efficient optical coupling.

Regarding claims 9-11 and 19, Broom and Tanaka '611 disclose an arrangement and method as recited above. The references, however, do not specifically disclose an optical waveguide having an SiO₂ coating, structured as a plurality of individual optical waveguides, and having an input and output cross-sectional area that is different in size and geometric orientation.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have an optical waveguide having an SiO₂ coating since one would be motivated by its reflective properties. As for a waveguide made up of a plurality of individual optical waveguides, one of ordinary skill in the art would recognize this construct as well known in the art for providing variability and flexibility in optical transmission. Furthermore, having an input and output cross-sectional area that is different in size and geometric orientation can be defined routinely when waveguides are trimmed at a slant angle and polished. This not only enhances coupling efficiency, but is recognized by one of ordinary skill in the art in semiconductor laser devices.

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9. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Broom in view of Tanaka '611, and in further view of Thillays et al. (U.S. Patent No. 4,387,385, from hereinafter "Thillays").

Broom and Tanaka '611 disclose the system arrangement as recited above with a plastic protective body. However, the references fail to specifically disclose a plastic protective body made from opaque plastic of either thermoplast or duroplast and characterized with filler particles for thermal conductivity.

Thillays discloses a semiconductor light-emissive diode apparatus using an opaque thermoplast characterized with filler particles for thermal conductivity (col. 4, lines 8-14).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a plastic protective body made from opaque thermoplast characterized with filler particles for thermal conductivity since one would be motivated not only to fill the interstitial space to ensure mechanical coherence and protection (col. 1, lines 13-18), but also to provide reflectivity on its surface. Although the thermoplast itself is opaque, the reflective properties which are at least equal to those of silver-plated or gold-plated surfaces has the advantage of minimizing optical interference between adjacent light conductors (col. 2, lines 22-32).

10. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Broom in view of Tanaka '611, and in further view of Tanaka et al. (U.S. Patent No. 5,307,362, from hereinafter "Tanaka '362").

Broom and Tanaka '611 disclose the system arrangement as recited above with a substrate structure. However, the references fail to specifically disclose a substrate structure that is singulated made of panel-shaped or a strip-shaped metal sheet.

Tanaka '362 discloses a semiconductor laser device with a substrate support that is singulated and made of a panel-shaped metal sheet (fig. 4, ref. 15).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a substrate support that is singulated and made of a panel-shaped metal sheet since one would be motivated to enhance beam performance. Having a substrate as described above facilitates adjustment and positioning of the laser device components to an improved orientation that optimizes laser beam performance of the laser chip while also equalizing the product quality (col. 2, lines 13-23).

11. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Broom in view of Tanaka '611, and in further view of Benett et al. (U.S. Patent No. 5,548,605, from hereinafter "Benett").

Broom and Tanaka disclose the system arrangement as recited above with a substrate structure.

However, the references fail to specifically disclose a substrate structure that is in thermal contact with a coolant that flows around or across at least a portion of its surface. Furthermore, the references do not specifically teach a substrate having a heat exchange body with microchannels or microplates that is disposed in the vicinity of the

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power semiconductor device and on the side of the substrate structure facing away from the semiconductor device.

Benett discloses a laser diode device having a substrate structure (fig. 2a, ref. 16) that is in thermal contact with a water coolant (fig. 2a, ref. 14) that flows around or across at least a portion of its surface (fig. 2a, ref. 10). Benett further teaches the substrate having a heat exchange body with microchannels (fig. 2a, ref. 10) and is disposed in the vicinity of the power semiconductor device on the side of the substrate structure facing away from the semiconductor device (fig. 2a).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a substrate structure having a heat exchange body with microchannels for water coolant flow and is disposed in the vicinity of the power semiconductor device on the side of the substrate structure facing away from the semiconductor device since one would be motivated to reduce thermal dissipation around the laser diode (col. 2, lines 24-25). While it is important to cool the laser diode to an acceptable level, one would further be motivated by above described structure to do so without providing a high average output of power and without diminishing laser power (col. 3, lines 7-20).

12. Claims 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Broom in view of Tanaka '611, and in further view of Po et al. (U.S. Patent No. 5,268,978, from hereinafter "Po").

Broom and Tanaka disclose the system arrangement as recited above with a transparent plastic material filling the space between light-emitting power semiconductor device and the optical waveguide.

However, the references fail to specifically disclose a cylindrical lens between light-emitting device and the optical waveguide.

Po discloses an optical fiber laser having a cylindrical lens between a light-emitting device and an optical waveguide.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated a cylindrical lens since one would be motivated to enhance the reduction of loss between optical transmission of the semiconductor device and the waveguide resulting from the transparent filling by providing increased efficiency in optical coupling (col. 3, lines 39-47), which ultimately enhancing laser light guiding performance.

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Y. Wang whose telephone number is 703-305-7242. The examiner can normally be reached on M-F, 8 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on 703-305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.


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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

gw
January 15, 2003


ROBERT H. KIM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800